



## Presentation

FULL DETAILS AND TRANSCRIPT

### Using Word Problems to Teach Number Sense

Worthington Hooker School, Connecticut • June 2008

Topic: National Math Panel: Critical Foundations for Algebra  
Practice: Mathematics Preparation for Algebra

#### Highlights

- Teacher describes lesson: day at carnival set of open-ended problems which require students to combined different numbers to fit parameters ; many different answers are possible
- Teacher models what he expects of students: how to take a the first step and choose numbers to begin with; how to use different strategies
- Goal of having students look at set of numbers and manipulate them in multiple ways and then discuss responses with each other
- Developing conceptual understanding of addition and subtraction through open-ended problems with multiple answers
- Teacher asks questions to have students explain their reasoning
- Problems that lay groundwork for multiplication and division

#### About the Site

Worthington Hooker School

New Haven, CT

## Demographics

45% White

25% Black

22% Asian

7% Hispanic

37% Free or Reduced-Price Lunch

11% English Language Learners

6% Special Education

The Worthington Hooker mathematics program exemplifies the goals of the New Haven School District in holding high expectations for all students and preparing them for STEM career options. The school implements these features:

- Focus on fewer topics at deeper level of understanding;
- Cross-grade units with “significant tasks;”
- Benchmark testing four to seven times a year;
- Extensive focus on number sense and fractions;
- Roles for specialist teachers (i.e., physical education, music, visual arts) in providing additional math practice;
- Bi-monthly school level data team meetings; and
- Monthly coaches meetings at a district level to review results of school-level data team meetings.

## Full Transcript

### Slide 1

Welcome to Using Word Problems to Teach Number Sense.

### Slide 2

My name is Paul Salem. I am a third grade teacher at Worthington Hooker School in New Haven, Connecticut.

### Slide 3

As we work with what is provided in the lower grades, we work with the initial addition and subtraction algorithm and then integrate that into more detailed problems—detailed as in using multiple strategies, addition and subtraction in order to solve the problem.

#### Slide 4

We have a solid review in subtraction and addition of single-digit numbers and we slowly progress up into the double-digit and the triple-digit numbers. And as the progression goes on for the rest of the year, we start to integrate that into more in-depth word problems that require a lot more thought and a lot more explanation.

#### Slide 5

The problems today, they can apply that knowledge of addition and subtraction to solve their problem. It was a carnival. It was a day at the carnival. So, they had to pick what they were interested in doing for the day. They could approach it that way, or they could also approach it by what numbers, and what I really wanted to see was the numbers that were easy to work with. If one event costs \$3 and another one costs \$7, I was able to see—which was nice—the groups being able to make that into \$10 and oftentimes, that was where they would start. They might start with the higher numbers first. They feel more comfortable with that because then they feel that they can squeeze in the other numbers so they can fit the parameters of the problem.

#### Slide 6

At the beginning, what I wanted to do was I wanted to model what I was expecting from the groups looking at the given information in the problem, putting that information down and then taking a close look at the entire problem. I talked them through how I went about solving and I looked at some strategies. I wanted them to look at what numbers were easier to manipulate than other numbers, what was going to be a good first step for them to take. So, I modeled that and had them also be able to experiment on their own.

#### Slide 7

My goals were twofold, one was to have the students work in groups to discuss their responses and really to be able to look at a group of numbers, look at a set of numbers and be able to manipulate them and have answers, actually, that there was no one correct answer for the problem; so be able to express themselves in multiple ways.

#### Slide 8

Demonstrating a conceptual understanding, as we know, is essential for them to gain understanding, providing them with straight multiplication or division fact practice is not going to really make them

understand what multiplication/division really means. The way I approach it is through the use of pictures, through the use of manipulatives like we have seen in the lesson today with the cubes where they can manipulate money, pretending the cubes were money, and actually manipulate them and take them away and add them. I like to look at problems that have multiple answers. I feel that that builds that conceptual understanding.

#### Slide 9

Actually, being able to see problems like was done today with the carnival problem—multiple ways of solving, having four different possible solutions in a group of four and then actually explaining it—that modeling really helps. And it doesn't always have to come from the teacher; it can come from the peers. Having them see that there is multiple ways to solve a problem and being able to explain their thinking really keys me in on their conceptual understanding.

#### Slide 10

Oftentimes, when I will go around to the groups, I will say, "How does this work? Why were you able to use these numbers? Why did you use these numbers instead of other numbers?" So, getting them to actually explain why they did a certain thing was definitely what I looked for—whether they have a good grasp on it.

#### Slide 11

Really having that abstract thinking, that's a large challenge for a lot of students. And having the culmination like we did today where they were in groups, I get them in groups to be able to talk through their thinking. But really to be able to see them today and observe the groups as I went around and actually hear what they are thinking led me to believe that many of them are on that right track to get that abstract thinking.

#### Slide 12

The problems today, they can apply that knowledge of addition and subtraction to solve the problem, but they can also look at the multiplication aspect of it because if they are riding on the Spin-O-Rama, for example, if it was \$7 and they rode it twice, they can use their multiplication knowledge—which we are getting into at this time in the year, where two times seven equals 14, rather than just the straight seven plus seven.

Slide 13

So, they are starting to put in the multiplication, the fact practice that we have done, the word problems that we have done with multiplication, and starting to move away from that addition into laying the groundwork for future grades with their multiplication and then, subsequently, their division.

Slide 14

To learn more about teaching number sense, please see the additional resources on the Doing What Works website.